8-2 The student will demonstrate an understanding of Earth's biological diversity over time. (Life Science, Earth Science)

Key Concepts:
Biological adaptations: species, traits, variations, adaptation, natural selection
Fossils: types of, fossil record
Catastrophic environmental events: comet or asteroid impact, climate change, volcanic activity
Geologic Time Scale: era, period, epoch
Diversity of Life:
Relative Dating: rock layering, law of superposition, index fossils, trilobites
Extinction

Supporting Content Web Sites

"How Was the Geological Time Scale Developed?"
http://www.wisegeek.com/how-was-the-geological-time-scale-developed.htm
This is a short, concise description of the origin of the geological time scale.
8-2.4

"Rockman"s Geologic Time Chart"
http://www.rocksandminerals.com/geotime/geotime.htm
This explains the subdivisions and relationships of the categories of the Geologic Time Chart.
8-2.4, 8-2.5

"Endangered Animals-Extinction is Forever"
http://www.uen.org/utahlink/activities/view_activity.cgi?activity_id=3820
This site explains extinction and the causes of it. It has links to sites of nine extinct animals, including the Carolina Parakeet.
8-2.7

"Paleobiology: Fossils And Time"
http://www.emc.maricopa.edu/faculty/farabee/biobk/BioBookPaleo1.html
This includes a description of Paleobiology, the study of fossils, methods of age dating, the geological time scale with objectives, terms, questions, review and links.
8-2.2, 8-2.5

"Species Diversity and Biodiversity"
http://www.physicalgeography.net/fundamentals/9h.html
This site describes species diversity and biodiversity including the effects of major extinction events. It also includes links to other sites.
8-2.3

"Geologic Time"
http://pubs.usgs.gov/gip/geotime/contents.html

This site has links to information about geologic time, relative time scale, major divisions of geologic time, and index fossils (radiometric time scale and age of the earth are not part of this standard).
8-2.4, 8-2.6

"Three High-Altitude Peoples, Three Adaptations to Thin Air" ?????
http://news.nationalgeographic.com/news/2004/02/0224_040225_evolution.html
This site compares three high-altitude people and their adaptations to thin air.
8-2.1

"Welcome to Understanding Geologic Time"
http://www.ucmp.berkeley.edu/education/explorations/tours/geotime/index.html
This is a good site for introducing students to geologic time, including fossils, index fossils, relative dating, geologic time scale, and much more.
8-2.4, 8-2.5

"Adaptation"
http://en.wikipedia.org/wiki/Adaptation
This site describes different types of biological adaptation.
8-2.1

Suggested Literature

Sloan, C. (2006). *How Dinosaurs Took Flight: Fossil Science, What We Think We Know, and Mysteries Yet Unsolved.* National Geographic Children's Books
ISBN: 0-7922-7404
This book cites evidence that supports the theory that birds are descended from ancient dinosaurs. It also points out the mysteries that are as yet unsolved, awaiting further fossil discoveries.
8-2.2

Lindop, L. (2006). *Cave Sleuths.* Lerner Publishing
ISBN: 0-7613-2702-9
This book describes cave formation and the study of the Earth system and the organisms found in a cave environment and their adaptations.
8-2.1

Turner, P. (2006) *Gorilla Doctors: Saving Endangered Great Apes.* Houghton Mifflin
ISBN: 0-618-44555-2
This book describes the Mountain Gorilla Vet. Project, including the impact of human borne diseases on the gorillas and their survival.
8-2.7

Grace, K. (2004). *Forces of Nature: The Awesome Power of Volcanoes, Earthquakes, and Tornadoes.* National Geographic Society
ISBN: 0-7922-6328
This book describes forces of nature and the effects these can have on human populations.
8-2.3

Burnie,D. (2004). *Endangered Planet.* Houghton Mifflin
ISBN: 0-7534-5776-8
This book describes natural cycles and habitats and the impact that humans have on the environment.
8-2.7

Koppes, S. (2003). *Killer Rocks from Outer Space" Asteroids, Comets, and Meteorites.* Lerner Publishing
ISBN: 0-8225-2861-4
This book describes the catastrophic effects of pre-historic meteor and comet impacts on planet Earth.
8-2.3

Simon, S. (2000). *Gorillas.* HarperCollins
ISBN: 0-06-023036-3
This book includes information explaining what is endangering gorilla populations and what is being done to protect them and their habitat.
8-2.7

Chorlton, W. (2001). *Wooly Mammoth: Life, Death, and Rediscovery.* Scholastic
ISBN: 0-439-24134-0
This book describes the excavation of a frozen wooly mammoth and the expertise and technology involved. It also includes theories about the disappearance of these creatures.
8-2.3

Goodman, S. (2001). *Claws, Coats, and Camouflage: The Ways Animals Fit Into the World.* Millbrook Press
ISBN: 0-7613-1865-8
This book has descriptions of how different animals are adapted for surviving in their environments.
8-2.1

Sloan, C. (2002). *SuperCroc and the Origin of Crocodiles.* National Geographic Society.
ISBN: 0-7922-6691-9
This book is about the Mesozoic Era and the origins of crocodiles. It compares ancient ones to modern ones.
8-2.5

Suggested Streamline Video

Earth Science: History of the Earth
Part1: Early Life on Earth
Part 5: Sixty-five Million Years Ago: The Cretaceous Period and Extinction
ETV Streamline SC
This video show how things have changed for planet Earth in the past 4.6 billion years.
4:37; 4:30
8-2.5, 8-2.7

Our Changing Earth
Part 1: The End of the Dinosaurs
Part 2: Earth's Changing Landscape
ETV Streamline SC
This video gives examples of changes, especially changes on Earth with an emphasis on the extinction of dinosaurs. This video also traces the history and causes of Earth's variety of terrains.
7:35, 7:41
8-2.3

Earth Science: Fossils
ETV Streamline SC
This video shows scientists at work with fossils. It also explains the formation of amber.
20:00
8-2.2, 8-2.3, 8-2.5, 8-2.7

TLC Elementary School: Prehistoric Earth
All Sections
This video covers the nature and divisions of geologic time, prehistoric life-forms, and fossils.
24.33
8-2.2, 8-2.3, 8-2.4, 8-2.6, 8-2.7

Career Connections

Paleontologist-
teaches at colleges or works in museums, especially with fossils. Some of them still work for oil companies, but these positions are dwindling.
8-2.2, 8-2.6

Geoscientist-
investigate the Earth, its soils, oceans, and atmosphere; forecast the weather; develop land-use plans; explore other planets and the solar system; determine environmental impacts; and find new sources of useful Earth materials. These are just a few of the ways geoscientists contribute to our understanding of Earth processes and history.
8-2.1, 8-2.2, 8-2.3, 8-2.7

Geobiologist-
investigates the interactions between biological and geological systems at all scales of space and time; 2) geomicrobiology and biomineralization processes; 3) the role of life in the evolution of the Earth's system
8-2.1,8-2.2

Geochemist-
inorganic and organic geochemical processes occurring at or near the earth's surface now and in the past, and at the broad spectrum of interfaces ranging in scale from planetary and regional to mineral-surface and supramolecular structures.
8-2.1, 8-2.2

Space scientist-
may be involved in many different areas. One area of interest is the study of meteorites and their impact on the Earth.
8-2.3